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# PRESENT STATUS OF ELECTRIC SHOCK THERAPY*

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After ten years of personal experience with electric convulsive therapy (ECT)[1] a survey of the present status of this treatment is a welcome opportunity to take stock of established facts, questions still under dispute and the limits of our present knowledge. In psychiatry such critical reviews are more important than in other fields of medicine, because the split among psychiatric schools on questions of theory makes the acceptance of clinical facts more difficult. This is all the more true for the somatic treatments in psychiatry, because they strongly contradict the theoretical concepts of many psychiatrists.

Theoretical objections against electric shock treatment are so frequently and so violently voiced that it seems justified to make some general remarks before a detailed discussion of various aspects of the treatment is given. It is true that no adequate theory for ECT is available, but this is no valid reason against its application. The patient who needs help, cannot wait until empirical knowledge has found a satisfactory theoretical basis. In most psychiatric conditions we do not know the etiology, and, therefore, cannot expect to understand the

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mechanism of a treatment which was found on empirical grounds.

Equally immaterial is the objection that ECT is only a symptomatic treatment. When we remove an involutional melancholia or an acute schizophrenic psychosis, we achieve more than a symptomatic improvement. But even in those cases where ECT only leads to a temporary improvement, its use can be valuable, and no one will object to insulin in diabetes on the grounds that its effect lasts only for hours.

Psychiatry is in great danger of becoming dogmatic when it postulates that only one type of treatment should be used to the exclusion of all the others. Those of us who for many years knew psychotherapy as the only available tool in psychiatry, are glad that, as in other fields of medicine, different procedures become available, and that we learn to discriminate in applying our various therapeutic techniques.

The original technique with alternating 60 cycle current, as introduced by Cerletti and Bini,[2] is still the standard procedure. Their bitemporal application of a forceps system of electrodes is unjustly abandoned by many manufacturers of machines. The forceps electrodes are far more practical in the treatment of uncoöperative patients than electrodes fastened with rubber bands. Of the many machines recommended by competing manufacturers the least complicated ones should be preferred, because they are less apt to present mechanical troubles. A successful solution requires only the continued efforts to find a type of current which abolishes some of the unpleasant side-effects of ECT. These attempts can be summarized as follows: The first claim of reducing post-treatment memory impairment was made by Friedman and Wilcox[3] who introduced a unidirectional current in which only one phase of the usual biphasic current is used. Lessening of memory impairment and of electroencephalographic changes were claimed but this effect was more definite in the subsequent development by Liberson[4] of a brief stimuli technique. Recently, Wilcox, too, replaced his unidirectional long stimuli with brief stimuli of about 500 per second, while Liberson reduced the number of stimuli to 120 per second with a duration of .5 to 1.0 milliseconds for the individual stimulus. These newer techniques produce convulsions with a lower amount of current applied for a longer period of time. It should be pointed out that this can be done equally well with the usual 60 cycle current, but was avoided because lower milliamperage is usually felt by the patient. It is admitted that for this same reason many patients treated with the

more recent modifications of ECT become apprehensive of the treatment. Since we, thus, lose the greatest advantage of ECT, the newer techniques are not generally accepted and have been given up by a number of experienced workers who have tried them. Whether the advantage of lesser memory impairment which was actually never confirmed in comparative studies, is really due to the different type of current or to such other variables like vertex-temporal application of the electrodes, is the subject of an investigation now under way at the Psychiatric Institute. Among many other techniques, Delmas-Marsalet's method with pulsating direct current,[5] Strauss and MacPhail's steep wave electroplexy,[6] and Larragoiti's brief stimuli technique[7] with three electrode–vertex and bitemporal–application may be mentioned. They all have the same therapeutic results, because not the electric current but the convulsions are therapeutically effective. Memory impairment is certainly not explained by a higher current intensity. We are now using two or three stimuli routinely in each treatment for reasons given later, and yet, the patients show no more confusion than before we used this technique. Reports on these techniques often mentioned "slight" seizures whose descriptions resemble incomplete seizures. In our experience such incomplete seizures followed by quick awakening are therapeutically ineffective. This is also true for the rarely encountered Jacksonian seizures and for subconvulsive (petit mal) responses.

While those recommending the technical modifications mentioned so far, did not claim better therapeutic results, this was done by some workers for the so-called Electronarcosis Treatment[8] which applies electric stimulation for 7 or more minutes. After a personal experience of two years with this method, I am unable to see any advantage over ECT; to the contrary, since it is cumbersome, frequently felt by the patient, and certainly more dangerous, as shown by Garmany and Early,[9] I decided to give it up. The term "Electronarcosis" is unjustified, because the patient has a generalized seizure. After a typical tonic phase, the clonic movements are suppressed by the continued flow of current; when after 30 seconds the current is reduced, the last clonic movements of the convulsion still become visible. When the current is stepped up again, the patient remains in a rigid state which does not seem to have any therapeutic value and during which some patients become restless and begin to feel the current. Bowman

and Simon[10] have shown that patients with depressions need the same number of applications as were necessary in previous episodes treated with ordinary ECT, and that there is no evidence of a superiority in any type of schizophrenia. It is true that some favorable reports have appeared,[11,12] but no convincing statistical proof of its claimed superiority over ECT or even over insulin was given.

ECT has the great advantage of being a surprisingly harmless procedure and any recommendations complicating its simplicity should be carefully tested as to their safety. Convulsions seem to be a preformed mechanism which can be safely elicited in every individual. This explains why fatalities in uncomplicated ECT are practically unknown, and why preëxisting diseases are hardly aggravated by the treatment. Hypertension and myocardial damage, so frequent in the group of involutional agitated depressions, are not likely to increase during a convulsive treatment. This should be known to all psychiatrists, and it is unfair to shift the responsibility for the treatment of such patients to a medical consultant who is unacquainted with the fact that in such cases the cardiovascular condition improves as soon as the strain of the emotional disturbance is removed. Tuberculosis is also no contraindication for ECT. In view of the frequent simultaneous occurrence of tuberculosis and schizophrenia, it is regrettable that some hospitals still preclude such patients from treatment of their psychotic condition. The constant gain of weight after successful ECT was often seen to improve the condition of tuberculous patients. Pregnant women were treated in the last month of their pregnancy without any harm to mother or child. The fact that in epileptics other diseases are not aggravated by the convulsions, explains why most of the originally postulated contraindications for ECT were unjustified. It may be mentioned that children[13] as well as patients beyond seventy and eighty years of age[14] can be safely treated.

The most harassing complication of ECT continues to be the occurrence of fractures. Those of the mid-thoracic spine are of limited clinical importance and never lead to any serious consequences; continuation of treatment where necessary, does not increase the degree of compression. We do not know of any instance where X-ray findings prior to treatment could have predicted such occurrence, and it is unjustified to consider arthritis or old deformities of the spine as contraindications. A more serious problem are the fractures of the

long bones, particularly humerus and femur, and those rare but often bilateral fractures of the acetabulum. It should be stated emphatically that there is no way of predicting such fractures. In our large treatment group we never had fractures of the long bones, but in a much smaller material in another hospital, the author had several such instances with the same technique. Special position of the patient hardly prevents fractures, but they are favored by tight restraint. As a preventive measure we routinely induce a subconvulsive response in order to make the patient relaxed before the convulsive stimulus is applied. Another attempt to prevent fractures is the slow stepping-up of the current, the so-called glissando technique (Tietz), which we found unreliable.

A reliable but dangerous method to prevent fractures is the use of curare (Intocostrin Squibb).[15] Our own experience and increasing evidence in the literature show that curare is more dangerous than the complications it is supposed to prevent. Contrary to uncombined ECT, several fatalities in patients treated with curare were reported, and others in patients who died from the injection of curare even before the convulsion was induced,[16] are sufficient warning against routine application of this drug; we consider it valuable, however, in patients where preëxisting bone pathology such as Paget's disease or recent fractures would otherwise preclude a strongly indicated course of ECT.

Less dangerous but also complicating the treatment is the preliminary use of intravenous sodium amytal or pentothal in ECT. These drugs increase the patient's respiratory difficulties which are anyway the most frequent complication in ECT which we counteract by routine application of a few artificial respiratory movements. Lessening of muscular contraction and of the strain on the heart as a motivation for the use of these drugs are not borne out by our experience. Only severe postconvulsive excitement states are a sufficient reason to inject 7½ grains of sodium amytal intravenously. A less dangerous, though not quite reliable means of preventing postconvulsive excitements is the use of 4 or 5 cc. coramin given intravenously prior to ECT. This combination was first recommended by Fabing[17] as a means to increase the effect of ECT in excitement states. This might have the same explanation as the seemingly better response of such conditions to metrazol treatment with its combined chemical and convulsive effect on the brain.

Fear of the treatment is no sufficient reason to use sodium amytal

routinely. In ordinary ECT, contrary to metrazol therapy, unpleasant sensations are absent. Yet, some fear is often expressed and connected with the idea of losing consciousness. More puzzling is a stronger fear reaction which takes place in some patients after several treatments. The patient usually gives no explanation for this ill-defined fear which seems to be related to his confusion. Some patients explain it with the belatedly remembered period of awakening from their previous treatments.

The organic reactions during ECT are not limited to memory impairment but, like all organic reactions, they show emotional changes. They can be distressing but they are never of long duration. Thorough psychological testing as well as psychiatric follow-ups have convincingly ruled out any permanent organic damage beyond the deteriorating effect by the psychosis as such. Likewise temporary is the electroencephalographic evidence of brain damage after ECT. This is in accordance with the absence of neuropathological evidence of irreversible brain damage. Pathological findings reported by some observers, were not confirmed in any of the numerous subsequent investigations. Organic psychotic reactions of manifold symptomatology which may occur even after very few treatments do not seem to have a neuropathological basis; they clear up without leaving any traces even if the point of deep organic dementia is reached which some clinicians produce purposely by giving 3 or 4 treatments daily in order to increase the therapeutic effect of ECT. We did not convince ourselves of the need for such accumulation of treatments but can confirm the harmlessness of this procedure regarding permanent damage.

The importance of ECT as a valuable tool in psychiatry is no longer under dispute among those who have ever applied it, even though the various shock treatments perhaps did not live up to early expectations. Many psychiatrists still reject ECT for reasons of principle without having any experience with it. Indiscriminate use of the treatment by unqualified men lends some weapon to those fighting it. Such indiscriminate use is easily promoted by the possibility of ambulatory treatment. Yet, ambulatory treatment as such is not objectionable and will have an increasingly important place in our fight against mental illness. It can be given in clinics as well as in offices. Although the larger part of the author's personal experience derived from hospital patients, no complications were ever encountered that could not be

dealt with just as well in an office. The disadvantages of ambulatory treatment are more than compensated by its social importance. Respiratory difficulties which are the only true emergencies can be dealt with in any office well equipped for this particular type of treatment. More unpleasant for the physician than for the patient are the post-convulsive excitement states for which the psychiatrist giving ECT should be prepared with adequate personnel and measures for temporary restraint until such patients regain full consciousness. A disadvantage of both, clinic and office treatment, is that the patient must be taken care of by his family during the confusional state frequently caused by ECT. More serious is the difficulty to give a sufficient number of treatments to ambulatory patients. The patient and his family are not easily convinced that often treatment has to be continued after the patient is symptom free. This, and the occasional activation of symptoms are the reason why schizophrenics who require a long course of treatments, should rather be hospitalized. Exceptions are chronic cases where not more than a symptomatic effect of a few treatments is planned, and those where treatments are given chiefly as a prognostic test to determine how promising a full hospital course of any type of therapy would still be.

In view of the many problems involved in ambulatory treatment, it should be requested that only psychiatrists with special experience in this field should be allowed to give office treatment, that one or two specially trained nurses are available, that the treatment not be given to patients unaccompanied by relatives, and that the patient be kept in the office for at least one hour after the treatment. Other requirements are that the family be fully informed of the fact that patients under ECT have to be watched constantly at home for approximately one week after the last treatment until the confusion has cleared up, and finally that the psychiatrist giving the treatment should feel responsible for a follow-up of the patient and, if the patient requires hospitalization during the treatment, discuss with the hospital the continuity of the treatment.

Clinic facilities for ECT should be provided to an increasing extent in general hospitals and, more important, in state hospitals. This would eliminate the admission of patients whose symptoms can be removed with very few treatments such as depressions, and it would prevent readmissions of patients who had a full course of treatment in the

hospital but, after discharge, have a tendency to relapse. Such treatment, successfully applied in most English mental hospitals, would change the after-care clinics of institutions into active treatment centers and decrease the admission rate.

## Indications

The main indications for ECT have been listed frequently. Yet, there is so much confusion and disagreement that they will be discussed here once more in an attempt to clarify some of the disputed points.

The value of ECT in the affective disorders is generally accepted. Its almost specific effect in clearing up depressions after 4 or less treatments is the most convincing proof that this somatic method in psychiatry is a therapeutic approach in the right direction. There are few better predictable therapeutic effects in medicine. Manic-depressive, involutional and old-age depressions react equally well. It is amazing to see most depressions of various depths and duration clear up with the same number of three to five treatments. One or two additional treatments are advisable, but there is little evidence that in depressions a longer course of treatment promises a more lasting effect. It is true that manic-depressive episodes recur whether treated or untreated, but the great value of ECT in these conditions cannot be questioned when we realize how much human suffering is prevented by shortening the episode. The safe prevention of suicides should be reëmphasized, because we all know of instances where misrepresentation of the treatment in newspapers and motion pictures discourages patients and relatives from accepting the only treatment which prevents suicides in depressions. It is frequently overlooked that moderate depressions are a much greater suicidal risk than advanced cases with no initiative left. Delaying treatment in such cases is negligence. ECT as the treatment of choice in depressions belongs to those facts about psychiatry which the general practitioner should know because it is he who sees these patients when they begin to be sleepless, to lose weight and to complain of vague physical symptoms. In these patients general medical measures are of no avail including the endocrine substances which are still widely used in involutional depressions.

Contrary to depressions, manic episodes were often reported to be unresponsive to ECT. This is not so when one to three treatments are given on several subsequent days. Failures are often due to the wrong

diagnosis of certain schizophrenic syndromes as manic episodes. That depressed patients after ECT turn hypomanic is not infrequent, and often represents a short organic reaction which does not require further treatment. When a true manic episode follows a depression, renewed treatment is indicated. Manic-depressives who constantly change from elation to depression are poor candidates for ECT except for a symptomatic removal of the more acute psychotic manifestations. Preventive use of ECT once a month in manic-depressives was successfully tried by Geoghegan and Stevenson.[18] Unfortunately, few patients are coöperative enough for such treatment.

In involutional melancholia 5 to 8 treatments are usually sufficient. Failures belong almost exclusively in the group of involutional psychoses of the paranoid type. They respond less well and need a much longer course of treatment. Their treatment prognosis often depends on the depressive component in their symptomatology.

Schizophrenia is the disease for which convulsive therapy as well as insulin coma treatment were originally introduced, and for several years, exclusively used. The spectacular results of ECT in the affective disorders discouraged psychiatrists regarding its application in schizophrenia. It is true that here the quick response to 4 or 5 electric shock treatments is often followed by a relapse, but routine application of 20 or more treatments even in cases of early improvement, makes results comparable to insulin therapy. Some workers feel that in paranoid schizophrenics insulin yields better results. More and more hospitals have replaced the difficult insulin method by ECT. We do not entirely agree with this attitude. In a disease where all treatments are still highly unsatisfactory, every approach should be used. The frequent competitive recommendation of the various shock treatments has to be replaced by an effort to supplement one method with the other.

Applied adequately, ECT gives 60 to 70 per cent good remissions during the first six months of illness in patients with acute onset. The remission rate remains satisfactory up to one year of illness but drops rapidly after one year, thus emphasizing that early treatment in schizophrenics is imperative. Figures are much lower in patients with insidious onset of the disease.

Of the subtypes of schizophrenia catatonic excitements respond best; next are acute paranoids. Catatonic stupors, wrongly considered

the best prospects for ECT, relapse frequently. The poorest results are obtained in hebephrenics. This is not surprising when we realize that the primary schizophrenic symptoms respond little to treatment, and that even patients with good results maintain some "scarring," such as reduced affectivity or some thinking disorders.

Complete failure is often encountered in "late" paranoids and similar syndromes in the middle age group, classified as paraphrenia. Also cases close to the rare group of true paranoia do not respond. Another group usually refractory to ECT is that of hypochondriasis in the older age bracket. These patients with bizarre physical complaints are usually treated a long time for physical ailments until the psychiatric origin of their complaints is recognized. They are often diagnosed as agitated depressions. They rather belong to the schizophrenic group, but respond less to ECT than most schizophrenics do.

The inadequacy of ECT in the treatment of schizophrenia explains that combinations with other treatments are frequently used. Combined ECT-insulin treatment is indispensible in schizophrenia in spite of the experience that patients who failed under intensive treatment with one shock method respond little to others. In combined convulsive-insulin therapy metrazol has not been entirely replaced by ECT. At the Psychiatric Institute we combine it with ECT without seeing any of the originally dreaded respiratory difficulties. The convulsion is given at the end of the hypoglycemic coma, and the coma is terminated immediately after the convulsion by means of a previously introduced nasal tube. Combination of ECT with fever therapy (Fuster[19]) is used in those countries where sulphur in oil and other fever producing preparations are considered valuable in the treatment of schizophrenia.

Since the introduction of lobotomy and other neurosurgical procedures it is important to establish when shock treatment in a schizophrenic should be given up. The still prevailing attitude to limit surgery to chronic cases of many years' duration, has to be revised. Our recommendation is to apply 20 to 40 shock treatments, and in case of failure, insulin in combination with convulsive therapy. This requires hardly more than six months, and surgery can be considered before one year of continuous sickness has elapsed.

The relationship between ECT and the psychosurgical procedures requires two more comments. A "prognostic electric shock test" is a useful tool in the selection of chronic schizophrenic patients for psy-

chosurgery. Such a test consisting of 3 or 4 convulsions removes temporarily the reversible part of a psychosis and will tell how far the patient's personality is still preserved under a psychotic syndrome. Thus, it may show whether an uncommunicative catatonic is completely empty or only blocked, and give important clues as to how far the patient's symptoms can still be removed by surgical procedures. Finally, postoperative ECT is sometimes useful in removing psychiatric manifestations uninfluenced by surgery.

A discussion on ECT in schizophrenia would be incomplete without stressing the importance maintenance treatment with one or two occasional ECT given whenever an incompletely improved patient begins to become worse. Such treatments keep many patients on a better level and may prevent readmissions. Applied in all chronic wards of mental hospitals such symptomatic treatment can do away with restraint, tube feeding, continuous baths and similar measures, and thereby completely change the looks of the "backwards" of our mental institutions. The effect on the morale of patients, relatives and the hospital personnel is a factor which cannot be overrated.

It is not generally recognized that ECT is of some value for the psychotic manifestations of certain organic conditions. In general paresis a few ECT remove mental symptoms prior to malaria or penicillin therapy, and, thus, facilitate the treatment of such patients in general hospitals where they would otherwise not be acceptable. Also residual symptoms after malaria or penicillin therapy respond well to ECT. Psychotic episodes in cases of Parkinson's disease or other neurological diseases respond equally well to ECT. In epilepsy psychotic manifestations such as clouded states which are often interrupted by spontaneous convulsions, respond well to artificial electrically induced seizures. Epilepsy is no contraindication for ECT, and it was shown that the convulsive threshold is temporarily raised after each preceding convulsion. Therefore, in patients with predictable convulsions as seen in menstrual epilepsy, artificial seizures can even be used to prevent spontaneous convulsions. This has little practical importance but it is another proof that the fear of epilepsy as an after-effect of ECT is unfounded.

A few rarer indications seen to have in common the blurring effect of ECT. Neurodermatitis and other itching skin conditions may heal when the urge for scratching is temporarily eliminated by a few con-

vulsions. Attacks of bronchial asthma often disappear while a patient is under ECT, but also an aggravation of asthma has been reported (Cohen and Holbrook[20]). Withdrawal symptoms in morphine addicts can be eliminated by a few ECT.

The largest group of psychiatric patients not responsive to ECT is represented by psychoneurotics. Most criticism of ECT results from its indiscriminate use in the psychoneuroses. It cannot be emphasized enough that contrary to psychotics, some neurotics may be harmed by ECT. Anxiety, as the most frequent symptom in neurotics, is often aggravated. Many neurotics react badly to the memory impairment and complain of it long after psychological tests have shown that actually no impairment persists. Conversion symptoms sometimes disappear as they may do after any impressive treatment, but more often side-effects such as headache, muscle pain, and so on, are added to the patient's complaints. The only group of neurotics where ECT is indicated, are the reactive depressions. They respond as well as other depressions, but the neurosis from which the depression developed, remains subject to psychotherapy. Only few authors felt that ECT expedites psychotherapy in those psychoneurotics who seem rutted in their illness (Hamilton[21]).

The question of psychotherapy in all cases treated with ECT takes up much space in the literature but remains unsettled. The statement that ECT should be only used as an adjunct to psychotherapy has been reiterated in many papers, but no attempt has ever been made to compare series of ECT patients treated with and without simultaneous psychotherapy. It is unquestionable that the most favorable results in ECT were reported from large institutions where no psychotherapy was applied. The comparison of two series treated by us with the same technique, showed far more favorable results in the institutional material in spite of the lack of psychotherapy. This applies only to psychotics, while in psychoneurotics, if there is any indication for ECT, it can only be an adjunct to psychotherapy. Psychotherapists frequently request ECT from us to break through a patient's resistance. This can be done by using the organic blurring which is a side-effect of ECT, but it is of questionable value and not comparable to the curative effect of ECT in many psychoses. Our experience led us more and more to the conclusion that psychotherapeutic measures and shock treatments have mostly different indications and rarely overlap.

The reluctance on the part of some psychiatrists to apply ECT even in those cases where a favorable result is clearly predictable, is based primarily on theoretical objections. It is true that the shock treatments have no foundation in psychological theories; on the other hand, those thinking in organic terms, are as much at a loss to understand their action. As treating physicians we cannot wait for satisfactory theories. As psychiatry begins to enlarge its therapeutic armentarium, we psychiatrists like other physicians will learn to select the right therapeutic techniques for the right type of patient. If this is done, ECT applied with discrimination, will be helpful in many psychiatric patients.

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